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ABSTRACT

Reported are findings of a longitudinal study on the differential effects of five preschool programs on comparable groups of 4-year-old disadvantaged children. Descriptions are given for the five preschool programs studied: the Bereiter-Engelmann program, which involves intensive oral drill in verbal and logical patterns; the Karnes Ameliorative program, a psycholonguistic model derived from the Illinois Test of Psycholinguistic Abilities; the community integrated program, which provided a traditional nursery school experience sponsored by community groups; the Montessori program, which provided a prepared environment and a program structured around the prescribed manner in which the child learned from materials; and a traditional preschool or nursery program. Included in a summary of findings were that no statistically significant differences were found among groups on the Wechsler Intelligence Scale for Children 10 years later; that Student Interview data revealed no difference in the child's self concept of school performance across interventions; and that Locus of Control scores were found to be significantly related to Binet IQ scores for all Ss. (SBH)

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IMMEDIATE, SHORT-TERM AND LONG-RANGE EFFECTS OF FIVE PRESCHOOL PROGRAMS FOR DISADVANTAGED CHILDREN

Session 4.02
Developmental Continuity Consortium:
In-depth Program Review
Monday, March 27, 1978
4:05 - 6:05 P.M.

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Introduction

During the 60's an imposing body of theoretical and empirical evidence was offered to support the assumption that educational intervention has maximum impact with children under five years of age. Social scientists representing diverse educational philosophies generally agreed that developmental processes and behavioral responses undergo rapid change and are most malleable during the early years (Hunt, 1961; Bijou and Baer, 1961, 1965; Kirk, 1958; Piaget, 1952).

Recognizing the importance of early stimulation to later development, investigators initiated experimental programs designed to stimulate the cognitive and verbal development of young children who were academically at risk because of experiential deprivation (e.g., Deutsch, 1964; Dilorenzo and Salter, 1968; Erickson, et al., 1969). The federal government, impressed by the results of these early efforts, subsequently undertook the support of a number of preschool models for disadvantaged children. The controversy that followed was inevitable, given the diversity of programs. By the mid-sixties, systematic comparisons of the various preschool models had begun.

In 1965, Dr. Merle B. Karnes at the University of Illinois, Urbana-Champaign Campus, initiated an extensive study of the differential effects of five preschool programs on comparable groups of four-year-old disadvantaged children. Assessment of differences was made through batteries of standardized tests administered prior to intervention, following the preschool year, and at the end of kindergarten. Additionally, effects of three programs were evaluated five years after the intervention when the subjects had completed the third grade.

In 1975, ten years after the original preschool study, Karnes, along with thirteen other investigators who had conducted studies of early school experiences, was asked to undertake an evaluation to assess the long-term effects of early educational intervention. The major findings, to date, of this longitudinal follow-up are reported here. This paper, therefore, falls into two sections. The first, a brief description of the 1965 preschool study and a summary of the comparative data from the first five years of follow-up, provides a framework for understanding the long-term follow-up. In the second, the data from the ten-year follow-up are reported and discussed.

The 1965 Preschool Study and Follow-up through the Third Grade

Program Description

Five preschool programs were selected for comparison in the original study: 1) Bereiter-Engelmann, 2) Karnes Ameliorative, 3) Montessori, 4) community integrated, and 5) a traditional preschool or nursery. These programs were chosen on theoretical as well as practical bases. The major dimension separating the models was the degree of structure along a continuum from the traditional nursery to the highly structured preschool. The nature of teacher-child interaction was the critical feature of structure; as the specificity and intensity of the interaction increased, so did the degree of structure. Two programs, the traditional and the community integrated, represented the less structured end of the continuum. The third, Montessori, embodied an established theory which included much that can be identified with a child-centered or traditional approach and a methodology which incorporated considerable structure. The fourth, Karnes, and the fifth, Bereiter-Engelmann, fell at the highly structured end of the continuum.

The community integrated, Montessori, and Bereiter-Engelmann (B-E) programs were directed by their own staff; Karnes directed the Ameliorative (K1) and the traditional (K2) programs. In each program, children attended sessions of approximately two hours and fifteen minutes, five days a week, for a period of seven to eight months.

Comparability among groups was initially established by indentifying children who met age, income, and family history criteria and had had no previous preschool experience. In addition, children were administered the Stanford-Binet Individual Intelligence Test, Form L-M, and placed into three groups according to IQ: 100+ = high; 90-99 = middle; 70-89 = low. Children were then assigned to class units (N = 15) that maintained comparability of IQ, a sex ratio of 50% male and 50% female, and racial proportions of 67% black and 33% white. Finally, each class unit was randomly assigned to an intervention group. Two class units were assigned to the B-E, the K1, and the K2 programs. One class unit was assigned to the Montessori and the community integrated programs.

A brief sketch of the five programs in the original Karnes study will serve as a background for the discussion of results to follow.

Major goals for the Traditional Nursery School Program were to promote the personal, social, motor and general language development of the children. Teachers were instructed to capitalize on opportunities for incidental and informal learning, to encourage the children to talk and to ask questions, and to stimulate their interest in the world around them. Observers in the traditional classrooms typically found the teacher moving from one child to another, adjusting her/his interactions to each, asking questions of individual children and, at times, of the entire group, providing for the extensive use of materials and promoting child-child interactions whenever possible.

Outdoor play was a part of the daily routine; indoor play focused on a doll and housekeeping center, a vehicle and block center, and a small toy center which featured puzzles, beads, puppets, books and the like. Juice time, rest, show and tell and the routine supervision of toileting and outdoor wraps completed the daily schedule.

The community integrated program provided a traditional nursery school experience similar to the one outlined above. These centers were licensed by the state and were sponsored by community groups, and classes were composed predominantly of middle- and upperclass caucasian children whose parents paid tuition. The disadvantaged children in our study were integrated into the community integrated centers.

Socioeconomic integration was the pertinent variable rather than racial integration, which was achieved in all programs. Spontaneous verbal interactions represent critical opportunities for language development in the traditional nursery school since substantial periods of time are given to peer play. Language inadequacy of disadvantaged children might, therefore, sharply limit their progress in language development in such a setting. Central to the altered classroom dynamics in the community integrated program was the presence of an advantaged peer language model in addition to the teacher model provided in all programs. The high ratio of advantaged children assured that these children would determine the level of spontaneous verbalization. To the extent that children in a traditional nursery school acquire language from each other, the community integrated program provided the optimum setting for verbal development.

The Montessori program was administered by the local society, and staff and classroom materials met Montessori standards. The daily schedule began with a routine health check and toileting. The group then met for conversation, songs, fingerplays and exercises. The next half hour was devoted to a spontaneous choice of approved materials and was followed by a second period devoted to musical activities, stories and games. A practical life demonstration, juice time, toileting, the silence exercise and tidying the classroom occupied the next half hour. The final ten or twenty minutes of the session were given over to playground activities, or supervised short walks. The specific nature of the prepared environment raised the level of structure within the Montessori classroom beyond that of the two traditional programs. The Montessori teacher did not, however, maintain the level of specific control over the actions of children provided by teachers in the two highly structured programs. Structure in the Montessori program did not derive from direct teacher-child interaction, but rather from the prescribed manner in which the child learned from materials.

In the Karnes Ameliorative program (K1) a psycholinguistic model derived from the Illinois Test of Psycholinguistic Abilities was used to guide instruction. Since inadequate language represented one of the greatest problems for the low-income child, verbalizations in conjunction with the manipulation of concrete materials were considered to be the most effective means of establishing new language responses. A game format (card packs,

lotto games, models and miniatures, sorting, matching and classifying games) created situations where verbal responses could be made in a productive, meaningful context without resorting to rote repetition. If the child was unable to make a verbal response, the teacher supplied an appropriate model. When the child began to initiate such responses, the teacher had an opportunity to correct, modify and expand his verbalizations. Each teacher taught three twenty-minute structured periods to the same group of five children. The remainder of the morning was devoted to music, art, directed play, snack time and rest.

In the Bereiter-Engelmann program (B-E), intensive oral drill in verbal and logical patterns was the primary mode for instruction. Since disadvantaged children were considered adequate in perceptual and motoric skills but inadequate in verbal and abstract skills, each B-E class was divided into small groups for a twenty-minute period to teach language, arithmetic or reading. The general instructional strategy was that of rule followed by application. A verbal formula was learned by rote and then applied to a series of analogous examples of increasing difficulty. In addition, children were taught to read with a modified initial teaching alphabet. Finally, songs were written especially for the music period and provided practice in language operations, as did the story period.

Results and Conclusions at the End of the Preschool Year

At the end of the first year, children in all groups were tested on intellectual (Binet IQ) and language (Illinois Test of Psycholinguistic Abilities) development. The following results and conclusions were reported:

1) The two highly structured programs (K1 and B-E) demonstrated a substantial mean IQ gain (14 points). No child in either of these programs failed to make an IQ gain; 92% of the children in the K1 program and 74% in the B-E group scored in the above average intelligence strata at the end of the preschool year. Subjects in the other three groups made more modest gains (5 to 8 points), and from 14% to 24% of these children regressed. Clearly, the performance of the K1 and B-E groups on the Stanford-Binet was superior to the performance of the other three groups, and the magnitude and consistency of the gains endorsed the importance of providing structured settings for disadvantaged children in which reinforcement for making appropriate and increasingly complex verbalizations was used.

2) Initially, the children in this study had been most deficient in the three subtests of the ITPA related to verbal expressive abilities: vocal encoding, auditory-vocal automatic, and auditory-vocal association. During the preschool intervention, children in the K1 group eliminated their initial major deficiencies on each of these three subtests: the B-E group eliminated major deficiencies on two of the three subtests; the K2 group made improvements in all three areas, but not to the extent of the B-E and K1 groups. The performance of children in the community integrated and Montessori groups on these three subtests was, at best, static.

Generally speaking, then, these results endorsed a structured approach to preschool programming for disadvantaged children who were required to verbally respond to the teachers during certain structured activities.

Results and Conclusions at the End of the Kindergarten Year

In the second year, children in the K2, community integrated and Montessori programs attended public kindergartens for a half day; no research intervention was made. In contrast, children in the K1 program attended public kindergartens in the morning and, in addition, participated in a one-hour supportative program at the research center in the afternoon. Children in the B-E program did not attend public kindergarten and returned to the research center for a half-day program. Only children in the B-E group, therefore, were provided low teacher-pupil ratio and an intensive language program in the second year. Children in all groups were again assessed on intellectual (Binet IQ) and language functioning (ITPA) and, in addition, on reading readiness (Metropolitan School Readiness). The following results and conclusions were reported:

1) The IQ scores of the B-E group were superior to those of the other four groups. In fact, only the B-E group made a substantive gain (6 points) in IQ during year two of the study. The other four groups generally maintained gains made during the preschool year; typically, losses or gains did not exceed three points.

2) The B-E group was again the only program showing continued and appreciable progress in language development after the second year; children in this program averaged above chronological age on the three subtests related to verbal expressive abilities. The other four groups either maintained their gains in language development or regressed slightly.

3) The K1 group scored significantly higher on reading readiness than did the other four groups, a surprising result in view of the higher scores in intellectual and language development made by the B-E group. The one-hour supportative K1 program was apparently successful in fostering reading readiness.

4) The generally superior performance of the B-E group in intellectual and language functioning argued for the need to continue intensive special programming for disadvantaged children beyond the preschool year, especially in language development.

Results and Conclusions at the End of the First Grade for Three of the Five Preschool Programs

Follow-up data over three years were gathered for two K2 class units (N = 25), two K1 class units (N = 24), and one B-E class unit (N = 10). Children in these groups were assessed on intellectual (Binet IQ) and language development (ITPA) and on school achievement (California Achievement Test). Results and discussion in two areas merit mention.

1) No intervention program was entirely successful in providing the impetus necessary to sustain, at the end of first grade, the gains in intellectual functioning and language development made during the preschool years. Nevertheless, potentially serious learning deficits for children in the K1 and B-E groups were averted during the preschool year. The deterioration in language and intellectual functioning after the termination of the program suggests the need for continued intervention characterized by low pupil-teacher ratios which make possible the interaction necessary for language development and which provide the opportunity to design and implement learning experiences to achieve specific objectives.

2) At the end of first grade, the K1 and B-E groups scored significantly higher than the K2 group on the reading and math subtests of the California Achievement Test. These results confirmed the prediction that structured programs better prepare children for the more formal work of first grade. Additionally, the two years of reading instruction in the B-E program prior to first grade seemed to have been only as effective as the extensive readiness preparation in the K1 program in producing accelerated reading development. These results provide little evidence to support early reading programs for disadvantaged children. Given that the intent of preschool intervention for disadvantaged children is to alter in positive ways later school performance, both structured programs at the end of first grade must be judged successful.

Results and Conclusions at the End of Third Grade for Three of the Five Preschool Programs

Follow-up data were collected on children in the K1, K2 and B-E groups at the end of third grade. By this time, differences among groups on intellectual functioning and language development had disappeared; however, the reading achievement of the three groups, as measured by the California Achievement Test, revealed significant differences. At the end of the third grade, the K1 group was reading at grade level and scored significantly higher than did the K2 and B-E groups. The B-E and K2 groups were reading approximately one-fifth year below grade level.

In summary, the five-year follow-up generally indicated that immediate advantages in intellectual functioning and language development to children in the highly structured programs had diminished by the third grade. In the all-important area of school achievement, however, more persistent effects remained for children who had participated in the structured programs characterized by high levels of verbal interactive behavior and careful planning toward academic and cognitive goals. At the end of the third grade, however, only the K1 program remained significantly higher in academic achievement.

Follow-up Ten Years After the 1965 Preschool Study

In 1975 Karnes and her associates were requested to undertake a long-term follow-up of the youngsters who had participated in the original five-way comparison of preschool approaches. This request was part of a larger survey of children who had participated in preschool studies during the 1960's and early 1970's. Investigators were motivated by scientific curiosity as well as by the practical implications of knowing more about the long-term effects of the kind offered in Head Start and other experimental programs. The investigators participating in this follow-up became known as the Consortium on Developmental Continuity and were under the direction of Dr. Irving Lazar of Cornell University. The youngsters from the Karnes Intervention Study were fifteen to sixteen years old at the time of the Follow-up Survey.

Follow-up Instruments

Two sets of testing instruments were used in the follow-up: consortium instruments and Karnes Project instruments.

Consortium instruments were agreed upon by the consortium investigators and were to be administered by all projects whenever possible. These included the Wechsler Intelligence Scale (Form R), A School Record Form providing information about special education placement and retention, A Youth Interview in which the child was asked about his or her own educational performance and aspirations, and A Parent Interview in which parents were asked their opinions of the preschool programs in which their children had participated.

In addition to the above measures, the Karnes group employed the Locus of Control Scale (Nowicki and Strickland, 1971) and The Arousal Seeking Testing Instrument (Mehrabian and Russell, 1974).

The Locus of Control measure is designed to indicate the degree to which the respondent believes that the events that occur are a result of circumstances beyond his control such as fate or luck, or are believed to result from one's own behavior.

The Arousal Seeking Tendency Instrument (Mehrabian and Russell, 1974) is a measure of the respondent's tendencies to seek out environmental stimulation or to demonstrate curiosity and change-seeking behavior. Factors included in the instrument include arousal from change, unusual stimuli, risk, sensuality, and new environments. The total score was used for this analysis.

Locating and Testing Subjects

Locating children ten years after their participation in the preschool study and obtaining information from school records presented a number of problems to our staff which were undoubtedly common among consortium investigators. The original sample size had diminished, since some children had

moved away and others could not be located; some schools refused to release pupil information while others simply did not have the information to release. These and other problems resulted in an unequal number of responses on some of the measures reported here. In spite of these obstacles, 88 percent of the original sample were tested and efforts to locate and test others continue.

The following steps were taken to locate and test subjects:

1) The class roster of children who had been enrolled in the five preschool programs were compared with school computer records which included names of parents and addresses. This list was then cross-referenced with area phone books and school records.

2) An introductory letter was sent to the parent or guardian of each child explaining the purpose of the follow-up and requesting a meeting. In some instances letters were followed with phone calls.

3) The parent meeting was held to conduct the parent interview, to obtain permission for the child to participate in the follow-up study, and to secure clearance to examine the child's school records. Parents and children were contacted one week later to arrange a testing date, usually after school or on weekends.

4) The day before testing, subjects were called and transportation arrangements made. More often than not, the project provided transportation. Frequent scheduling problems were encountered here. Some youngsters changed testing dates as many as four times, while others failed to show at the appointed testing time.

5) Testing was the final step. Children were frequently brought in for testing two or three times to avoid fatiguing the child and thus adversely influencing the results. When a child was brought in for testing, the general purpose of the test was explained to him. Subjects were paid for their participation based upon the amount of time taken to complete interviews and testing.

Data Generated by the Consortium Instruments

1) The Wechsler Intelligence Scale for Children, Form R, was administered to students who had attended the five preschool groups. These youngsters were now fifteen or sixteen years of age. Table 1 compares the original number of subjects in each group with the number of subjects who were tested ten years later. Approximately 77% (78 out of 101) of the original group were tested, demonstrating relatively low attrition.

Table 1: Attrition by Intervention Groups

	Traditional (K2)	Bereiter-Engelmann	Karnes Ameliorative (K1)	Montessori	Community Integrated	Totals
Number in original group	28	14	27	16	16	101
Number Tested at 15-16	24	10	22	9	13	78
Percentage Tested	85.7%	71.4%	81.5%	56.3%	81.3%	77.2%

An analysis of variance, comparing the five intervention groups at age 15-16 was computed, using pre-intervention Binet IQ as a covariate. Univariate F tests with 1 and 72 degrees of freedom disclosed that the initial IQ covariate accounted for a significant proportion of the variance. The squared multiple correlation coefficient indicated that initial Binet IQ accounted for 37.5% of the variance in WISC-R Full Scale IQ at age 15-16 ($p = .0001$), 35.6% of the variance in WISC-R Verbal IQ ($p = .0001$), and 20.5% of the variance in WISC-R Performance IQ. This significant relationship between the initial Binet IQ scores and later WISC IQ scores is not surprising.

Greater concern and interest was focused upon analysis of differential effects of the five early childhood interventions. An analysis of variance disclosed no statistically significant differential effects upon the WISC-R Full Scale IQ, WISC-R Verbal IQ, or the WISC-R Performance IQ. The pattern of results obtained, with 95% confidence intervals for each of the 5 group means, are plotted in figures on the following pages. Before making inferences from the range of these 95% confidence intervals, the reader is cautioned to note that groups are of different size, a factor which may affect the standard error of the mean especially in the case of the groups with smaller numbers of subjects. The results disclosed no significantly different impact from any of the five early childhood interventions as measured by the WISC-R IQ

on subjects at age 15-16. It is regrettable that a control group was not constituted at the outset to make possible a comparison of intervention versus no intervention.

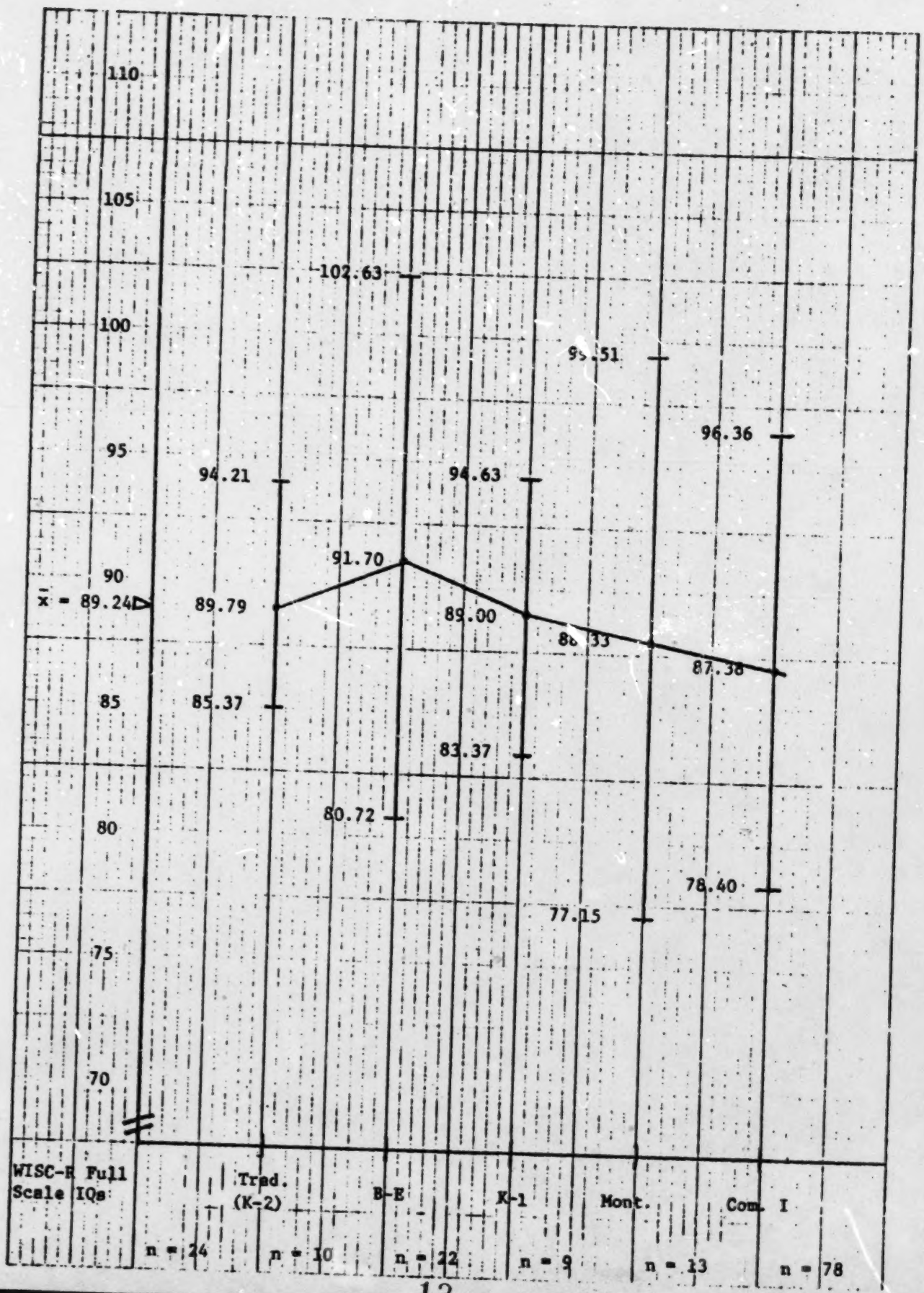
The reader is referred to the research of other consortium members for control group comparative analyses, most notably the report on "The Persistence of Preschool Effects" (Lazar, Hubbell, Murray, Rosche, and Royce, 1977). The analyses of Lazar et al. suggested that the effect of early intervention on WISC-R IQ is likely not to be permanent, and that "only in the projects with the youngest children (nine and twelve years old) were the scores significantly greater for the program group. However, in no project were the controls significantly higher than the program children." (page 20) In view of the fact that our covariate analysis reflected that 37.5% of the variance in high school WISC-R Full Scale IQ was accounted for by Binet IQ prior to intervention, these data suggest that 62.5% of WISC-R IQ is determined by factors other than the subject's Binet IQ at entry.

2) An analysis of school records of 77 subjects reflected that over 94.9% of the youth were still in school. Table 2 presents a comparison of the five groups in terms of current school status. Although 94.9% of the youth were still in school, this figure will no doubt drop as all of the subjects achieve their 16th birthday.

Table 2: School Records on Grade Child Attending

	Traditional (K-2)		B-E		Ameliortive (K-1)		Mont.		Comm. Inte.		Total	
Status	N	%	N	%	N	%	N	%	N	%	N	%
Dropped Out of School	0	0%	2	16.7%	1	5.6%	1	10%	0	0%	4	5.2%
Attending Grades 8,9,10	23	100%	8	66.7%	16	33.9%	9	90%	14	100%	70	91.0%
Ungraded	0	0%	2	16.7%	1	5.6%	0	0%	0	0%	3	3.9%

3) Youth interview questions were selected based on an interest in: a) obtaining an indication of the subjects' self-concepts in schoolwork when they compared themselves to their peers, b) determining if early language stimulation may have produced differences in self-initiated reading behavior in adolescence, and c) determining if early intervention concerns for the importance of family involvement appeared to be associated with any special patterns of family interaction during adolescence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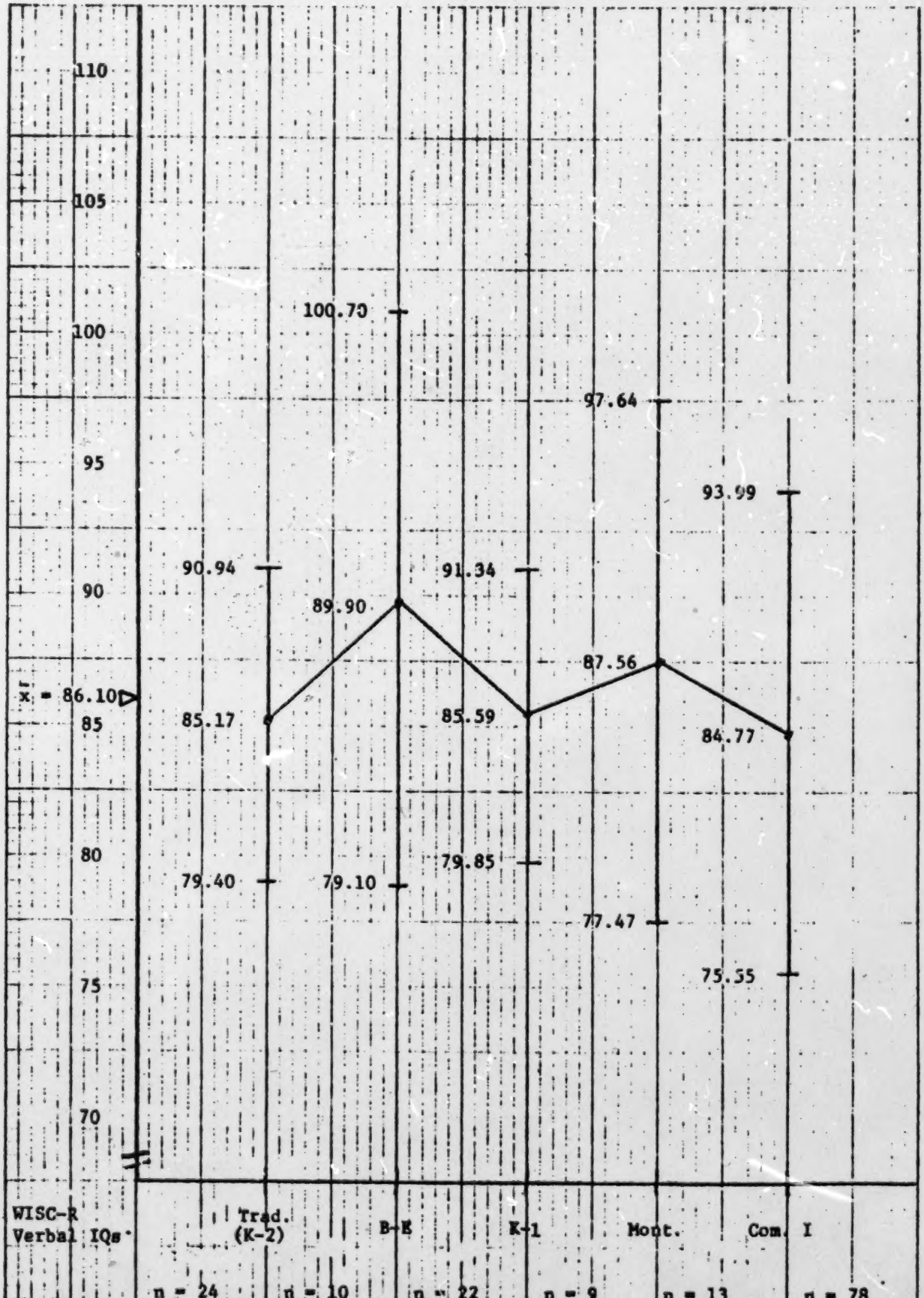
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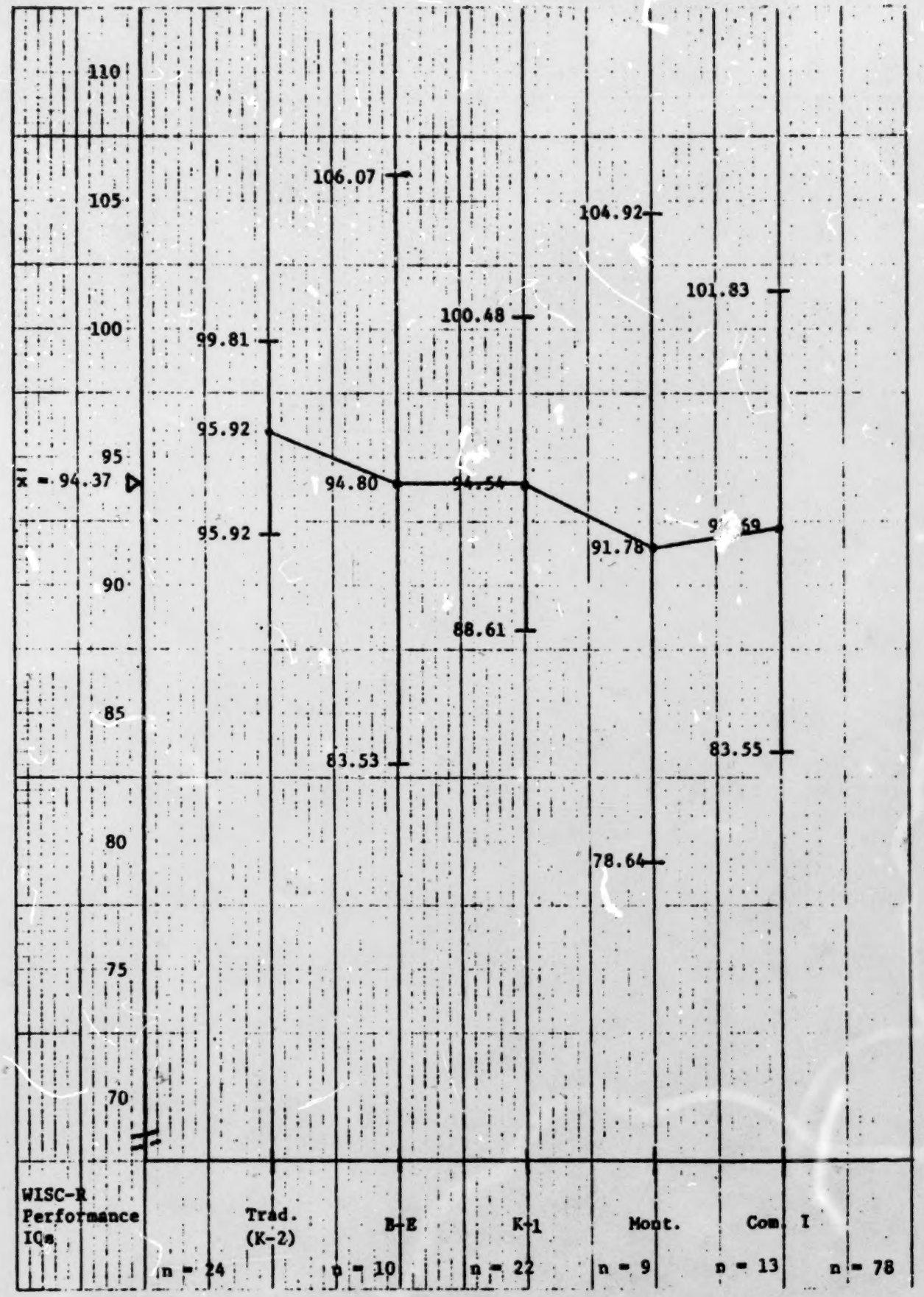
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WISC-R Performance IQs
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A question from the Youth Interview of particular interest was how students who had participated in the preschool study perceived their current academic performance in comparison to their student peers. On balance, 91.8% of the youths saw themselves as doing about the same or better than their classmates. Differences among groups were not statistically significant ($x^2 = 13.33$, 12 df, $p = .35$). Table 3 reports these findings in more detail.

Table 3: Response by Group to Youth Interview Question "How are you doing (did you do) in your schoolwork, that is, overall, not just one subject?"

	Traditional (K-2)		B-E		Ameliorative (K-1)		Mont.		Comm. Inte.		Total	
Answer	N	%	N	%	N	%	N	%	N	%	N	%
Much better than others	2	9.1%	0	0%	0	0%	1	11.1%	0	0%	3	4.1%
A little better than others	8	36.4%	3	33.3%	4	20.0%	5	55.6%	6	46.2%	26	35.6%
About the same as others	0	40.9%	5	55.6%	15	75.0%	2	22.2%	7	53.8%	38	52.1%
A little worse than others	3	13.6%	1	11.1%	1	5.0%	1	11.1%	0	0%	6	8.2%
Much worse than others	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
	22		9		20		9		13		73	

$x^2 = 13.33$, 12df $p = .35$

Possible long-term impact of the preschool curricula upon adolescent reading behavior was sought by two questions on the Student Interview. In response to the question "Do you read magazines?" 91.1% replied "yes." Significant differences existed among the groups, with the traditional (K-2) and Bereiter-Engelmann groups being significantly less likely to read magazines ($x^2 = 9.72$, 4 df, $p = .05$). Table 4 reports responses for the groups.

Table 4: Response by Group to Youth Interview Question "Do you read magazines?"

	Traditional (K-2)		B-E		Ameliorative (K-1)		Mont.		Comm. Inte.		Total	
Answer	N	%	N	%	N	%	N	%	N	%	N	%
NO	5	20.8%	2	18.2%	0	0%	0	0%	1	0%	7	8.9%
YES	19	79.2%	9	81.8%	22	100%	9	100%	13	100%	72	91.1%
TOTAL	24		11		22		9		13		79	

$x^2 = 9.72$, 4 df, $p = .05$ $n = 79$

Youth were also asked to indicate the types of books they read. Analysis of the first choice category mentioned by each respondent (Table 5) indicated a significantly differential pattern of reading behavior among the groups ($x^2 = 86.63$, 64 df, $p = .03$). A review of the types of books read by the youth disclosed significant differences in the overall pattern, with the traditional comparison group (which constituted only about 30% of the respondents) accounting for about 45% of the book reading reported by the youth in all five groups. The five most frequently mentioned categories of books read, when all responses for groups are considered, are as follows: Adventure/ Mystery (23.7%), Love/Romance (10.5%), Science Fiction (7.9%), Games/Sports/ Cars (7.9%), and Other (7.9%).

Youth responses to the interview question inquiring whether or not family members talked during meals disclosed that those who participated in the community integrated intervention were significantly less likely to report that their family talked during meals ($x^2 = 15.90$, 4 df, $p = .01$). The results are summarized in Table 6.

Table 6: Response by Group to Youth Interview Question "Do people generally talk during the meal?"

	Traditional (K-2)		B-E		Ameliorative (K-1)		Mont.		Comm. Inte.		Total	
Answer	N	%	N	%	N	%	N	%	N	%	N	%
NO	0	0%	0	0%	0	0%	0	0%	3	25%	3	
YES	21	100%	11	100%	20	100%	9	100%	9	75%	70	
TOTAL	21		11		20		9		12		73	

$x^2 = 15.90$, 4 df, $p = .01$ $n = 73$

Table 5

	Traditional (K-2)		Bereiter-Engelmann		Ameliorative (K-1)		Montessori		Community Integrated	
	N	%	N	%	N	%	N	%	N	%
Comic Books	0	0	0	0	1	11.1	0	0	0	0
Adventure/ Mystery	5	29.4	0	0	2	22.2	2	40	0	0
Western	0	0	0	0	0	0	0	0	1	50
Love/Romance	2	11.8	1	20	1	11.1	0	0	0	0
Fantasy	0	0	0	0	0	0	1	20	0	0
Spirituality/ Astrology	0	0	2	40	0	0	0	0	0	0
Science Fiction	1	5.9	0	0	2	22.2	0	0	0	0
Amusement/Humor	1	5.9	0	0	0	0	0	0	0	0
Games/Sports/Cars	2	11.8	0	0	0	0	1	20	0	0
Family Life	1	5.9	0	0	0	0	1	20	0	0
Self-Improvement	1	5.9	0	0	0	0	0	0	0	0
Recreation/ Hobbies	0	0	0	0	0	0	0	0	1	50
Information	0	0	0	0	1	11.1	0	0	0	0
Arts and Music	0	0	1	20	1	11.1	0	0	0	0
Nature Science	1	5.9	1	20	0	0	0	0	0	0
Animal Stories	1	5.9	0	0	0	0	0	0	0	0
Other	2	11.8	0	0	1	11.1	0	0	0	0
TOTALS	17	44.7	5	13.2	9	23.7	5	13.2	2	5.3

$x^2 = 86.63$ (64 df) $p = .03$ $N = 38$

A home environment within which interpersonal relationships are positive is highly desirable. Over 83.5% of the youth interviewed reportedly got along well or very well with the individuals with whom they are living. Some systematic variation among the groups achieved statistical significance at the p = .10 level, with youth in the Montessori (77.8%), Karnes Ameliorative (K-1) (50%), and Traditional (K-2) (45.8%) groups most frequently reporting that they got along very well (x^2 = 14.21, 8 df, p = .08). Table 7 presents the data for all groups.

Table 7: Response by Group to Youth Interview Question "Generally speaking, how do you get along with the family members with whom you live?"

	Traditional (K-2)		B-E		Ameliorative (K-1)		Mont.		Comm. Inte.		Total	
Answer	N	%	N	%	N	%	N	%	N	%	N	%
Very well	11	45.8%	2	18.2%	11	50.0%	7	77.8%	3	23.1%	34	43.0%
Well	10	41.7%	8	72.7%	7	31.8%	0	0%	7	53.8%	32	40.5%
About Avg.	3	12.5%	1	9.1%	4	18.2)	2	22.2%	3	23.1%	13	16.5%
Not Too Much												
Badly	(No responses in these two categories)											
TOTAL	24		11		22		9		13		79	

x^2 = 14.21, 8 df, p = .08 n = 79

4) Analysis of parent interview data presented here focuses primarily upon parent satisfaction with the programs, and secondarily upon parental knowledge about the child's participation in special educational programs. Since parents had more active roles in some of the interventions, it was of interest to see if differing degrees of satisfaction were among the long-term outcomes.

Parent Interviews were conducted with approximately 85% of the parents of children who had been enrolled in the preschool study. Parents were asked to evaluate many aspects of the programs and responses were very positive in most cases.

In response to the question "Was the program a good thing for your child?" the overwhelming majority (91.5%) of the parents answered "yes." This was not statistically significant at the .05 level, but it does evidence general satisfaction with these interventions (see Table 8).

Table 8: Response by Group to Parent Interview Question "Was the program a good thing for your child?"

	Traditional (K-2)		B-E		Ameliorative (K-1)		Mont.		Comm. Inte.		Total	
Answer	N	%	N	%	N	%	N	%	N	%	N	%
YES	23	95.8%	9	75%	19	90.5%	10	100%	14	93.3%	75	91.5%
NO	1	4.2%	3	25%	2	9.5%	0	0%	1	6.7%	7	8.5%
TOTAL	24		12		21		10		15		82	

x^2 (4df) = 5.78 p = .22 n = 82

Another way of determining parent satisfaction was to ask, 'What were some of the things you did not like about the program?' The failure of parents to mention program characteristics that displeased them provides another indicator of program success. Table 9, a comparison by intervention group is reported. Across groups, 80.3% of parents reported that no aspect of the program was disliked, however, parents of children who had been enrolled in the Bereiter-Engelmann program were much more likely to mention aspects disliked (only 41.7% reported nothing). The chi square value achieved significance at p = .05. The data is summarized in Table 9 below:

Table 9: Response by Group to Parent Interview Qeustion "What were some some of the things you did not like about the program?'

	Traditional (K-2)		B-E		Ameliorative (K-1)		Mont.		Comm. Inte.		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Nothing mentioned as disliked	18	85.7%	5	41.7%	18	90%	7	77.8%	13	92.9%	61	80.3%

x^2 (32 df) = 46.05 p = .05 n = 61

One of the arguments for early intervention is that it may help to reduce the number of children who subsequently require special education programs. Parents, therefore, were asked whether or not their child had participated in any special education or speech therapy programs. Table 10 indicates that 63.6% of the parents reported that their children had not attended special education classes at any time during public school attendance. Differences among the various educational interventions were not significant (x^2 = 3.08, p = .54), although it might be noted that there were two groups in which over 70% of the parents responded that their child had not participated in any special educational program: Karnes Ameliorative (77.8%) and Montessori (70.0%).

Because of the possible unreliability of parents as a source of accurate information regarding special education placement, we intend to compare parental response on special education placement with the school records.

Table 10: Response by Group to Parent Interview Question "Did child participate in any unusual educational programs in his/her school like speech therapy, special education, etc.?"

	Traditional (K-2)		B-E		Ameliorative (K-1)		Mont.		Comm. Inte.		Total	
Answer	N	%	N	%	N	%	N	%	N	%	N	%
YES	9	39.1%	5	41.7%	4	22.2%	3	30.0%	7	50%	28	36.4%
NO	14	60.9%	7	58.3%	14	77.8%	7	70.0%	7	50%	49	63.6%
TOTAL	23		12		18		10		14		77	

x^2 (4 df) = 3.08 p = .54 n = 77

Data Generated by the Karnes Project Instrument

1) The Locus of Control responses (Norwicki and Strickland, 1971) were scored so that higher values indicated a greater internal locus of control. Analysis of variance with includson of Binet IQ as a covariate disclosed that the covariate accounted for a significant proportion of the variance in locus of control scores (p = .04). The associated probability of the effect of the different interventions equaled .14, which was not significant at the .05 level. Trends in the data were explored based on a hypothetical acceptance of the very liberal significance level actually obtained. A posteriori comparisons (of all pairwise comparisons) were conducted, employing Duncan's multiple range test to determine which groups, if any, might have been significantly different from one another at the .05 level. This analysis disclosed that the Traditional (K-2) ($\bar{x}$ = 26.58) and Bereiter-Engelmann ($\bar{x}$ = 30.13) groups were not significantly different from one another but were significantly different from the Karnes Ameliorative (K-1) ($\bar{x}$ = 25.94), Montessori ($\bar{x}$ = 24.75) and Community Integrated ($\bar{x}$ = 25.27) groups. (See Table 11 for overall analysis of variance.)

Table 12: Analysis of Covariance for Locus of Control Scores at High School

Source	Sum of Squares	DF	Mean Squares	F	Significance of F
Intervention Groups	158.37	4	39.59	1.84	.14
Covariate (Binet IQ)	100.31	1	100.31	4.65	.04
Within Cells	1077.99	50	21.56		

Arousal Seeking Tendency

The data from the "Arousal Seeking Tendency" (Mehrabian and Russell, 1974) were analyzed to determine if the preschool interventions had produced any systematic differences in the tendencies of the subjects to seek out environmental stimulation or to demonstrate curiosity and change seeking behavior. A one-way analysis of variance using initial Binet IQ as a covariate was conducted. No significant differences among the five groups in arousal seeking were found, and the IQ covariate did not account for a significant proportion of the variance in the scores (see Table 12).

Table 12: Analysis of Covariance for Arousal Seeking Tendency at High School

Source	Sum of Squares	DF	Mean Square	F	Significance of F
Intervention Groups	507.46	4	126.88	.19	.94
Covariate (Binet IQ)	108.88	1	108.88	.17	.69
Within Cells	32739.70	50	654.79		

Summary of Long-Term Follow-up

The expectation that five preschool interventions would show significantly differential effects in high school is an extremely demanding criterion. Analyses of the differential program effects were conducted based upon standardized tests, interviews, and reviewing school records. Although no decisive advantage of one intervention over another has been demonstrated from this preliminary analysis, there exists significant variation in the impacts of the different interventions in some areas which should be carefully considered in the assessment of the impacts of these early childhood programs.

The following statements summarize the findings to date of the comparative analyses:

1. No statistically significant differences were found among groups on the Weschler Intelligence Scale for Children ten years later. Since this study, unlike others in the consortium (Lazar, Hubbell, Murray, Rosche, and Royce, 1977) did not include a control group, no statement can be made here about the performance of a comparable group that had not received intervention. Among five interventions, each designed to have beneficial impact, no decisive advantage fell to any one.

2. Analysis of the school records disclosed that 95% of the youth were still in school. As all the entire sample passes age 16, over the next two years, a more meaningful comparison of drop-out rate across groups can be made. The early trend among the limited 5% who have dropped out has indicated that, within each of the groups, relatively more of the Bereiter-Engelmann students have either dropped out or are in ungraded classes than is true within the other intervention groups.

3. The Student Interview data revealed no differences in the child's self concept of school performance across the interventions. For all groups, however, over 91.8% of the youth reported they were doing about the same or better than others, a finding suggesting that the youth have a generally positive image of themselves when they compare themselves to their age group in school.

   An analysis of the impact of early intervention upon reading behavior in high school disclosed that, while over 91.9% of all the youth reported that they read magazines, there were substantially fewer youth in the Bereiter-Engelmann and Traditional Comparison (K-2) groups that acknowledged participation in this reading activity.

   A generally positive climate prevails within the families of the subjects. The youth reported that they got along "well" or "very well" with their family in over 83.5% of the cases. There were significant differences among the alternative interventions, with the groups most frequently reporting they got along "very well" being the Montessori and Karnes Ameliorative.

When family interaction at meals was compared, the community-integrated subjects were significantly less likely to report that they talked during the meal. Although alteration of family interaction patterns was not the major focus of the curriculum interventions, some differences clearly emerged among the groups.

4. Over 91% of the parents belived that these early childhood interventions were good for their children. Although there was less agreement on this question from the Bereiter-Engelmann parents (only 75% agreed the program was good for their children), this difference was not statistically, significantly different from the other groups. However, when parents were asked what things were disliked about the interventions, significant group differences emerged. Over 58% of the Bereiter-Engelmann parents mentioned some program feature as being disliked, compared with the overall degree of dissatisfaction of only 13.4% for the other four groups combined.

5. Locus of Control scores were found to be significantly related to Binet IQ scores for all subjects.

6. No differences among the five groups were found on the Arousal Seeking Tendency instrument (Mehrabian and Russell, 1974) which attempted to measure the tendency of youth to seek out environmental stimulation or demonstrate curiosity and change seeking behavior. This is a relatively new instrument, and further modifications of the scale may be in order before using it in future research with similar groups.

In summary, it is essential to emphasize that results presented here are tentative; Karnes and her associates continue to analyze and collect longitudinal data from children in the original five groups.

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